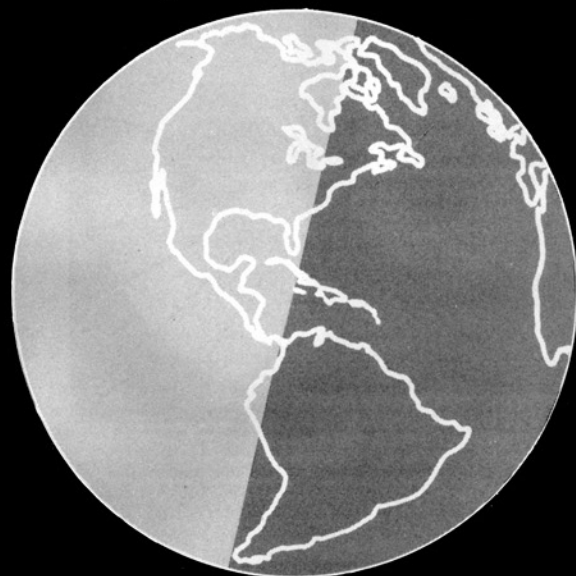# HOW TO USE AND ENJOY YOUR
Replogle® GLOBE

You now have a globe, a miniature model of Earth itself. Knowledge of our world begins with a globe and grows with its frequent use. The purpose of this book is to acquaint you with the many fascinating uses of your Replogle globe, and to demonstrate that using a globe can be as enjoyable as it is educational.

Seeing the world on a globe

People have been slow to accept the concept of a spherical world, yet the ancient Greeks knew Earth was round. The Greek historian, Strabo, wrote of a world globe ten feet in diameter made by Crates of Mallus and exhibited in 150 B.C. Thus, for centuries, men have known the shape of Earth, but most visualized it only as the small, flat area that embraced their everyday lives.

Today, however, we live in a global community, and the globe has become the map of our modern world. Jet travel and modern communication have overcome natural barriers, reduced distances between all nations. And man's exploration in outer space with manned and unmanned satellites has brought home graphically the roundness of our Earth and its place in the universe.

One of the basic uses of your globe is to find places—cities, nations, land and water areas—just as easily as you can find the busiest street corner in your home town. Finding a place is not enough, however, unless you see it in its true geographical relationship to the rest of the world or, in other words, see those countries which are its neighbors and the true distances and directions between them.

The question, "Where is it?", is answered best by using a globe, for only on a globe are distances, directions, sizes and shapes of countries, and their relationship to each other—all correct! Seeing the true geographical relationships of all nations on this round replica of our world increases our understanding of their economic, social and political status, as well as their interdependence. It has been said that wider use of the globe among all peoples of Earth could be a powerful instrument for peace.

Your globe will dispel any misconceptions about distances and directions obtained from studying flat maps. Looking straight down at the north pole, you see that ours is largely a northern world. Many great nations form a circle around the pole—Japan, China, the Soviet Union, the Scandinavian countries, the United Kingdom, Canada, the United States. Today, the Arctic has become a busy intersection for planes following the shortest routes between major cities of the world.

Not only is your globe a true guide to our modern world; its usefulness extends to many other areas of learning. It illuminates the pages of history, makes events in today's world more significant, enriches our understanding of the sciences including the exciting, new sciences of inner and outer space.
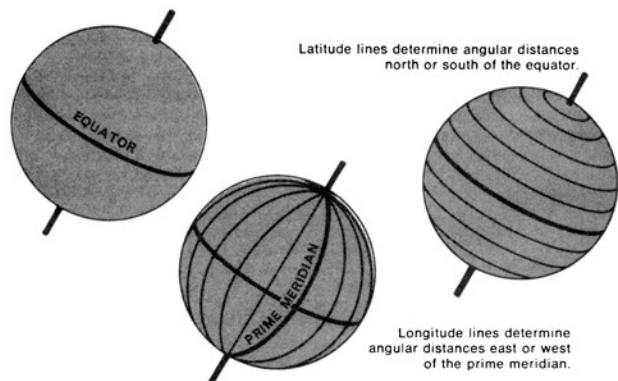
Learning the uses of your globe from the pages that follow will assist you toward its fullest enjoyment.

Finding places on your globe

Although a globe is round, with no beginning or end, there are two main reference lines from which all distances and locations are calculated. One is the equator running east and west around the middle of the globe, dividing it into two equal halves. The other is the prime meridian, an imaginary line running from pole to pole and cutting through Greenwich, a section of London, England. Both of these lines are 0° and the globe numbering system starts at the point where they intersect.

All lines running east and west, parallel to the equator, are called latitude lines. They are sometimes referred to as parallels because they are parallel to each other. Latitude lines are shown at 15° intervals north and south of the equator. Look at New Orleans on your globe and you will find it located at 30°. Since it is north of the equator, we say it is 30° north latitude, or 30N.

The lines running north and south from pole to pole are called longitude lines, or sometimes referred to as meridians. Longitude lines are numbered along the equator on your globe at 15° intervals east and west of the prime meridian at Greenwich. Again using New Orleans as an example, we find it located at 90°, or 90° west of 0° longitude. Thus, New Orleans is located at 30N latitude and 90W longitude.

Latitude lines determine angular distances north or south of the equator.

Longitude lines determine angular distances east or west of the prime meridian.

Remember, latitude lines go from 0° at the equator to 90° at the poles. Longitude lines go from 0° at the prime meridian to 180°, a point on the exact opposite side of the globe. In giving a position, latitude is always stated first.

Lines of latitude and longitude appear on your globe only at certain intervals; otherwise, they would cover up all other map detail.

The international date line

You will find the international date line along the 180° meridian in the Pacific Ocean on your globe. It is half way around the world from Greenwich. When it is noon in Greenwich, it is midnight on the international date line, and it is there that a new day is born.

Since we gain or lose an hour every 15° we travel east or west of Greenwich, if we were to travel completely around the world, we would lose or gain an entire day. The international date line is the place internationally agreed upon at which the loss or gain of a day takes place.

There are a few jogs in the date line. In order that the eastern tip of Siberia may have the same date as the rest of the Soviet Union and the Aleutian Islands may have the same date as Alaska, the date line jogs away from the 180° meridian to avoid these points.

The Samoa Islands, the extremity of another jog in the International Date Line, is a convenient place for ships sailing the area to change dates.

On a flight from Tokyo to San Francisco, a traveler who had started his dinner on Sunday would finish it across the date line on Saturday—the day preceding! When it is noon, Sunday, January 1, on the west side of the line, it is noon, Saturday, December 31, on the east side. Going west you advance a day; going east you go back a day.

Only at the stroke of midnight on the international date line is a day the same all over the world. A moment later, there are two days going on, on Earth at the same time. When Tuesday has arrived at the international date line, it is still Monday over the rest of the world. The new day moves westward.

When a day is six hours old, it has traveled one-quarter of the way around the world. Then one-quarter of the world is having Tuesday and the other three-quarters are having Monday. Six hours later, the new day is half way around the world, and in another six hours, three-quarters of the way. Finally, it approaches the date line again and another new day, Wednesday, is born.
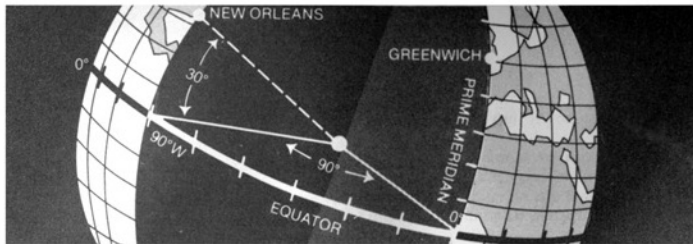
Measuring in degrees

Thousands of years ago, the Babylonians invented the system of dividing up a circle that cartographers use today. The distance around your globe, or any sphere or circle regardless of its size, is measured by dividing it into 360 sections called *degrees*, and each degree represents a fraction of the complete globe.

Angular distance is a term sometimes used in describing the location of a place on the globe. On the preceding page, we located New Orleans at 30°N latitude because, as shown in the illustration, a radius or line drawn from New Orleans to the center of Earth forms a 30° angle with one drawn from the equator to the center. Similarly, a radius drawn from the prime meridian at the equator to Earth's center forms a 90° angle with one drawn from the New Orleans meridian to the center. This locates the city 90° west of the 0° meridian.

Because Earth's area is so great that 1° can equal as much as 69.17 miles, the degree is broken down into smaller parts for more exact measurements such as those required for navigation. Each degree can be divided into 60 equal parts called *minutes* ('), and each minute can be further divided into 60 parts called *seconds* (").

Even the tiny second can be divided into decimals for greater accuracy, making it possible to pinpoint any place on the face of Earth, no matter how small. A single house in New Orleans, for instance, might be located at 30° 27' 14.085"N and 90° 43' 31.535"W.

Miles in a degree

The length of a degree of latitude on Earth's surface is about 69 miles, and is fairly constant because lines of latitude are all parallel and equally distant.

It is a different story with longitude lines, as they gradually converge toward the poles. One degree of longitude at the equator equals 69.17 miles, but as you move toward the poles, the distance between longitude lines diminishes. At 40° latitude, a degree of longitude equals 53 miles, at 60° the length of a degree of longitude is about 35 miles or approximately one-half of the equatorial length and, at 90° where all lines meet, it is 0 miles.
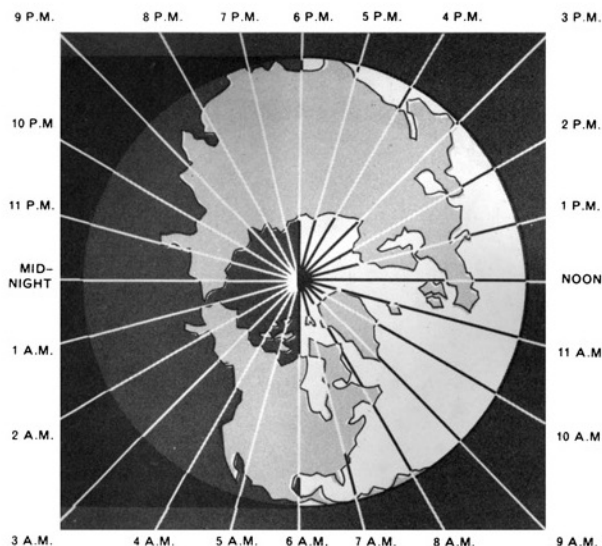
Meridians are sometimes called "hour lines" because Earth turns 15° or the distance of one meridian in one hour.

In the morning, your city is turning toward the sun. It passes under the sun at noon and turns away from it at night. Noon is the time when the sun is highest in the sky above you.

It takes twenty-four hours for Earth to make one complete rotation. Therefore, each of the twenty-four meridians on your globe, or a space of 15°, represents one hour of time.

The word *meridian* is from the Latin and means *mid-day*. All places located on the same meridian have noon at the same time. When a place is having noon, the sun is *on the meridian*. Before noon is known as A.M. (ante meridiem) and after noon is P.M. (post meridiem).

Because of Earth's rotation from west to east, when the sun is on the Greenwich meridian, all places west of Greenwich are *before* noon as they approach the sun. All places east of Greenwich are *after* noon as they have already passed under the sun.

Traveling great circle routes and measuring distances

We frequently hear the term *great circle* or *great circle route* used in connection with air travel and, more recently, space flights. *Great circles* are the greatest circles that can be drawn on a globe or on the face of Earth. They divide the sphere exactly in half. The equator is a great circle, and so is every meridian.

Because we live on a round world, the shortest route between any two points lies along a great circle. You will see this for yourself when you measure distances on your globe and discover that the arc of a great circle between any two points always creates a direct line.

Looking at a flat map, one would assume that to travel from Chicago (42N latitude) to Tokyo (36N latitude), one would head *west* and even a little *south*. But the shorter route is the great circle route, which can be simulated by stretching a piece of string tautly between the two cities. This route, hundreds of miles shorter, heads *northwest*, past the 60° parallel and southern Alaska, almost missing the Pacific Ocean entirely.

To compute the distance from Chicago to Tokyo, mark each city on your string, then place it on the equator line and count the number of degrees between marks. You will find there are about 89°. Multiplying by 69.17 (miles per degree at the equator), the answer is 6,156 miles.


Stretch a piece of string between Chicago and Tokyo on your globe, and you will see the most direct great circle route between the two cities.

Tracing great circle routes on your globe will give you a new idea of distances and directions. It may come as a surprise to those who have always studied flat maps, to find that the great circle route from Toronto to Bangkok is directly over the north pole; that the route from Melbourne, Australia to Rio de Janeiro, Brazil lies over Antarctica; that you head northeast from Seattle for the most direct route to Moscow.

Time equals space on your globe

Although the sun appears to rise in the east and set in the west, it is Earth that is moving, constantly rotating from west to east. It is this continuous turning toward the sun and away from it that causes day and night.

NEW ORLEANS   PARIS   CAIRO   TOKYO
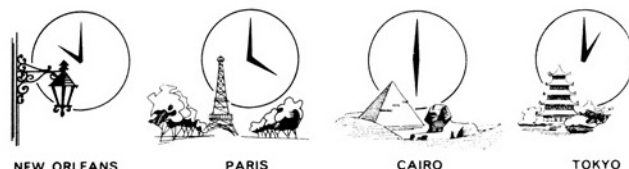
Using the time dial   (not available on 12 CM globes)

You can tell the time of any place on Earth by counting the number of meridians and figuring one hour *later* for each one east of you or one hour *earlier* for each one west of you.

Your globe has a time dial, loosely capped over the north pole, and you will see that it is divided into twenty-four equal parts, each representing one hour (or one meridian). Numbering is from noon to midnight and from midnight to noon. Half the dial is dark to indicate the darkness hours from sunset to sunrise and half is light for daylight hours.

Let us suppose you are in New Orleans. It is 10:00 A.M. and you want to know the time in Paris, in Cairo, and in Tokyo. Set the time dial so that 10:00 A.M. is directly in line with New Orleans, sighting along the 90°W meridian. Now rotate the globe (the time dial turns with it) until you find Paris. Sighting up along the nearest meridian, you find it is 4:00 P.M. Turn the globe to Cairo and repeat the procedure. It is 6:00 P.M. there. Now, rotating the globe all the way to Tokyo, you find the day is over and it's 1:00 A.M. the next morning.

Why we have standard time zones

If we did not have a system of standard time zones throughout the world, every spot on Earth would have a different time. Travelers would have the almost impossible task of trying to keep their watches set accurately.

At the equator, the earth rotates 1,038 miles per hour, or 17¼ miles per minute. Going westward, to keep accurate time, one would have to set his watch *back* one minute every 17¼ miles traveled. Traveling eastward, one would set his watch *ahead* in the same proportions.

To avoid such difficulties, Earth was divided into twenty-four time zones by international agreement. A traveler, then, has only to set his watch ahead one hour as he enters a new time zone going east, or back one hour if he is traveling in a westerly direction.

Each of the twenty-four time zones is centered on the 15° meridian and all time within any zone is the same. The boundaries of the zones are irregular in many places to suit local convenience. Obviously, it would be impractical for a city to have two different times because it happened to straddle a time zone boundary.